

SECTION D

SPECIFIC REGIONAL ANALYSIS REQUIREMENTS

REGIONAL EMISSIONS ANALYSIS AND CONFORMITY TESTS

CONFORMITY TESTS

Motor Vehicle Emissions Budget Test

What Is a Motor Vehicle Emissions Budget Test?

Analysis Years for the Motor Vehicle Emissions Budget Test

Which Nonattainment Areas Are Required to Demonstrate Consistency With An Emissions Budget?

Which Nonattainment Areas are Required to submit Control Strategy SIPs?

Which Motor Vehicle Emissions Budgets Should Be Used to Demonstrate Consistency When Control Strategy Implementation Plan Revisions and Maintenance Plans are Submitted?

What Conformity Test Should Be Used before EPA has Found the Submitted Budget Adequate?

Emissions Reduction Tests (for Areas Without Motor Vehicle Emissions Budgets)

Definition of “Baseline” and “Action” Scenarios

Analysis Years for Emissions Reduction Tests

CONFORMITY TEST HIGHLIGHTS IN THE 1997 CONFORMITY RULE

March 2, 1999 Conformity Court Decision

There Is More Flexibility Even Where There Are No Submitted SIP Budgets

Requirements for Network Modeling Are Limited to Large, Urban Areas

Rural Areas Have Flexibility to Choose Several Conformity Tests

AGENCY ROLES

TCM ANALYSIS

OFF-MODEL ANALYSIS

Transportation/Air Quality Sketch Planning Methods

TDM Evaluation Model

TCM Tools

Commuter Model

Methodologies for Estimating Emission and Travel Activity Effects of TCMs

Benefits Estimates for Selected TCM Programs

Quick Response System

Off-model Analysis for Heavy-duty Vehicles

Exhibits

- Exhibit 18: Conformity Elements
- Exhibit 19: Applicability of Conformity Tests By Type of Action
- Exhibit 20: Conformity Requirements By Action, Pollutant, & Classification
- Exhibit 21: Relationship Between SIP Budget Status & Conformity Tests
- Exhibit 22: Nonattainment Areas & Conformity Tests
- Exhibit 23: Which Regional Emissions Tests Apply?
- Exhibit 24: Projects & Activities Included in the Regional Emissions Analysis
- Exhibit 25: Typical Agency Roles in Integrating Transportation & Air Quality Modeling

SECTION D

SPECIFIC REGIONAL ANALYSIS REQUIREMENTS

The specific criteria and requirements are discussed in the following Chapters:

- # Serious and Above Ozone and CO Nonattainment Areas ([Chapter 6](#))
- # Moderate and Below Ozone and CO Nonattainment Areas ([Chapter 7](#))
- # PM-10 Nonattainment and Maintenance Areas ([Chapter 8](#))

REGIONAL EMISSIONS ANALYSIS AND CONFORMITY TESTS

In order for a nonattainment area to demonstrate conformity, certain conformity tests must be performed through regional emissions analysis. A regional analysis must estimate the emissions which would result from the implementation of the transportation plan/TIP, and compare these emissions to the motor vehicle emissions budget identified in the SIP ([see Section B](#)). If the emissions associated with the transportation plan/TIP are greater than the motor vehicle emissions budget, the transportation plan/TIP do not conform. This may occur even though all TCMs in the SIP are being properly implemented; for example, motor vehicle emissions may exceed the SIP budget if population and VMT growth are higher than predicted when the SIP was developed. Under no circumstances may motor vehicle emissions predicted in a conformity determination exceed the motor vehicle, pollutant-specific emissions budget.¹

The conformity rule requires transportation plans/TIPs to demonstrate consistency with the SIP's motor vehicle emissions budget by performing a regional emissions analysis. Specific conformity tests are required per nonattainment classification, and specific requirements are also applied to plans, TIPs and projects as well. [Exhibit 18](#) summarizes the general conformity elements for plans, TIPs, and projects. The types of conformity tests that are used and the actions that apply to different nonattainment areas are shown in [Exhibit 19](#) and [Exhibit 20](#).

¹ 40 CFR, 58 FR 62195, Nov. 24, 1993.

Exhibit 18
Conformity Elements

	Conformity Elements
Regional Emissions Analysis Requirements for Plans/TIPs	<ul style="list-style-type: none"> # Types of regional tests <ul style="list-style-type: none"> - budget test - emission reduction tests (e.g., build/no-build test) # Must cover 20-year planning horizon of the transportation plan # Must analyze all regionally significant projects # Must estimate VMT from all projects
Project-level Requirements	<ul style="list-style-type: none"> # Projects must come from conforming plan/TIP # Currently conforming plan/TIP must be in place for project approval # Hot-spot analysis in PM₁₀ and CO areas # Compliance with SIP's PM₁₀ control measures
Other Requirements (Applies to Plans, TIPs and Projects)	<ul style="list-style-type: none"> # Timely implementation of TCMs in SIPs # Interagency consultation and public participation # Latest planning assumptions # Latest emissions models # Modeling requirements
Projects not from a Plan/TIP	<ul style="list-style-type: none"> # Must not interfere with the implementation of any TCM in the approved SIP # Must be a currently conforming plan and TIP at time of project approval # Project must not cause or contribute to any new localized CO or PM₁₀ violations or increase the severity of any existing CO or PM₁₀ violations in CO and PM₁₀ nonattainment and maintenance areas. # Project must comply with PM₁₀ control measures in the approved SIP # Emissions budget or emissions reduction test requirements must be met

Exhibit 19
Applicability of Conformity Tests by Type of Action

	Transportation Plan	TIP	Project * (from conforming Plan/TIP)	Project** (Not from conforming Plan/TIP)
Regional Emissions (i.e., Budget Test {§93.118} or Emissions Reduction Tests {§93.119})	✓	✓		✓
Localized (Hot Spot) Emissions (§93.116)			✓	✓
Timely Implementation of TCMs (§93.113)	✓	✓		✓

Note: The specific tests depend upon the pollutant, nonattainment classification, and the status of the control strategy SIP or maintenance plan.

* Meets the requirements of 40 CFR §93.115, as amended by 62 FR, 43810, Aug. 15, 1997.

** Does not meet the requirements of 40 CFR §93.115, as amended by 62 FR 43910, Aug. 15, 1997.

Exhibit 20
Conformity Requirements By Action, Pollutant, and Classification
(These requirements are not all inclusive)

	Ozone		Carbon Monoxide		PM ₁₀	NO ₂
	Moderate and Above	Marginal and Below	Moderate >12.7 ppm	Moderate <12.7 ppm	All	All
Plan and TIP	Budget Test TCM Test*	Build/No Build or ≤1990 Test or Budget Test TCM Test	Budget Test TCM Test	Build/No Build or ≤1990 Test or Budget Test TCM Test	Budget Test TCM Test	Budget Test TCM Test
Project** (From Plan and TIP as Defined in §93.115)	No Additional Requirements	No Additional Requirements	Hot-Spot Analysis	Hot-Spot Analysis	Consistency with SIP PM ₁₀ Control Measures Hot-Spot Test	No Additional Requirements
Project** (Not From Conforming Plan and TIP as Defined in §93.115)	Budget Test TCM Test	Build/No Build or ≤1990 Test TCM Test	Hot-Spot Test Budget Test TCM Test	Hot-Spot Test Build/No Build or ≤1990 Test TCM Test	Consistency with SIP PM ₁₀ Control Measures Hot Spot Test TCM Test Budget Test	Budget Test TCM Test

Based on assumption that classifications required to submit control strategy SIPs have submitted SIPs with budgets that EPA has found adequate, and areas not required to submit control strategy SIPs have not submitted maintenance plans. Flexibilities for isolated rural nonattainment areas and clean data areas are not reflected.

* TCM Test is for timely implementation of TCMs included in SIPs, see Chapter 3.

**All pollutants and classifications: there must be a conforming plan and TIP at the time of project approval. Exceptions apply during a conformity lapse. Please refer to Chapter 4 for discussion of conformity lapse.

CONFORMITY TESTS

The 1997 conformity rule amendments made several changes to the requirements for conformity tests. Although specific requirements of different nonattainment classifications will be discussed in the following chapters, the key changes are summarized below:

- # SIP emissions budget is the primary conformity test when an adequate SIP budget exists,
- # Use of the emission reduction tests (e.g., build/no-build test) is minimized, and
- # Choice of additional options are available for tests in rural areas.

In general, there are two types of conformity tests related to regional analysis: the motor vehicle emissions budget test, also known as budget test, and emission reduction tests which will take the form of either build/no-build test, less-than-1990 test, or no-greater-than 1990 test. Detailed descriptions of the different types of conformity tests will follow. Exhibit 21 summarizes the relationship between SIP and conformity tests. Exhibits 22 and 23 further summarize the requirements of conformity tests applicable to different nonattainment areas.

Exhibit 21
Relationship Between SIP Budget Status & Conformity Tests

Status of SIP Budget	Conformity Tests
No SIP submitted	Emission reduction test(s) (e.g., build/no-build test) if there is no existing budget
SIP submitted and emissions budget found adequate ^{2,3} by EPA	Budget test
SIP submitted and emissions budget found inadequate by EPA	Budget test if existing, adequate or approved budget. If no existing, adequate or approved budget then emission reduction test(s).
Approved SIP ⁴	Budget test

² In the conformity rule, EPA has specifically listed 6 SIP adequacy criteria for transportation conformity purposes 40 CFR §93.118(e)(4)(i)-(vi), as amended by 62 FR 43811, Aug. 15, 1997.

³ See EPA May 14, 1999 Conformity Guidance on Implementation of the March 2, 1999 Conformity Court Decision and Section B.

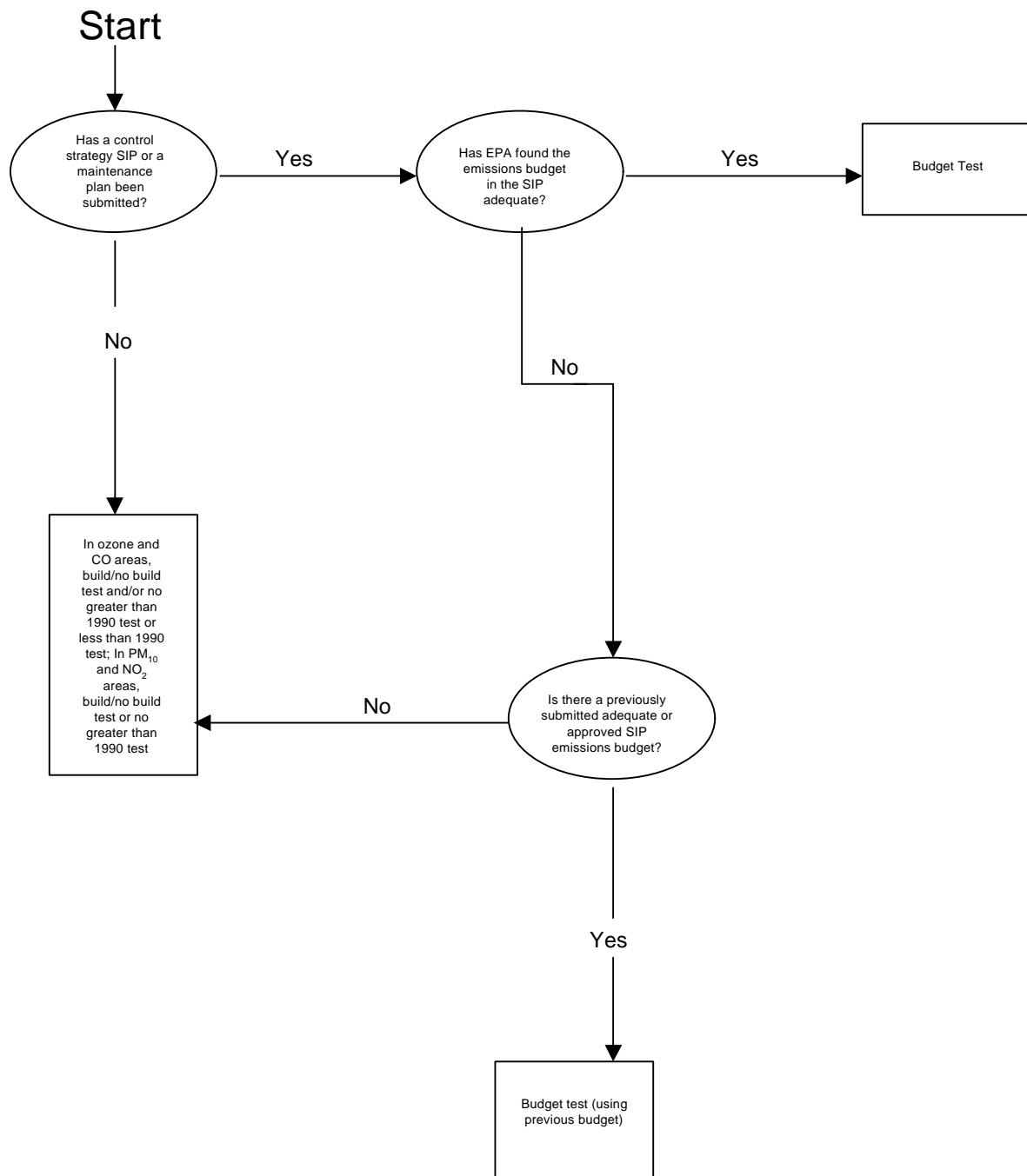
⁴ Nonattainment and maintenance areas may have different SIPs for a given pollutant with each SIP in a different stage of approval.

Exhibit 22
Nonattainment Areas & Conformity Tests
(40 CFR §§§ 93.109, 93.118, 93.119, as amended by 62 FR 43800-818, Aug. 15, 1997)

Nonattainment Areas		Conformity Test	Remarks
Areas that are required to submit control strategy SIPs and have	* Moderate and above ozone areas * Moderate (>12.7 ppm) CO areas * PM10 and NO2 areas	Budget test	
Areas that are required to submit control strategy SIPs but have not	* Moderate and above ozone areas * Moderate (>12.7 ppm) CO areas * PM10 and NO2 areas	Emissions reduction tests (build/no-build test AND no-less-than 1990 test)	
Areas that are not required to submit control strategy SIPs	* Marginal and below ozone areas * Moderate (<=12.7 ppm) and below CO areas	Emission reduction tests (build/no-build test OR no-greater-than 1990 test)	*Can decide to create budget through SIP process and do budget test * Decide through consultation process
Clean-data ozone areas without SIP	*Moderate and above ozone areas with 3 years of clean data that have not submitted a maintenance plan and that EPA has determined are not subject to RFP and attainment demonstration requirements	-Emission reduction tests OR -Budget test using budget from control strategy SIP OR -Budget test with budget based on most recent year of EPA-approved clean data (budget established through EPA's rulemaking used to declare a clean data area)	
When no budget established in an adequate SIP for a pollutant /precursor	* Limited maintenance area * Insignificant motor vehicle sources * Other cases with NO _x in ozone areas	No regional emissions test required	
NO _x Test Requirements of Nonattainment Areas			
Ozone area	* has NO _x waiver but no SIP * has SIP without NO _x budget ⁴	* No NO _x regional test required * Still need regional analysis for VOC	
PM ₁₀ area	If NO _x is a precursor	Emissions reduction tests if no NOx budget exists (build/no-build test OR no-greater-than 1990 test) OR Budget test if a NOx budget exists	NO _x waiver does not waive NO _x test
NO ₂ Areas	If NO _x is a precursor	Emissions reduction tests if no NOx budget exists (build/no-build test OR no-greater-than 1990 test) OR Budget test if a NOx budget exists	NO _x waiver does not waive NO _x test
Requirements of Isolated Rural Nonattainment Area			
Isolated rural area	Years addressed by the SIP	Budget test	Types of emissions reduction test (build/ no-build and/or less-than-1990 or no-greater-than 1990 tests) depending on the area's classification
	Years beyond the SIP	One of these three options: * budget test * emissions reduction test(s) OR * air quality modeling to demonstrate violations will not be caused or worsened	

⁴ NO_x budgets are not established in ozone SIPs when attainment/maintenance SIPs demonstrates NO_x increases are not a problem (e.g., use modeling to demonstrate that NO_x growth would not increase ozone).

Exhibit 23
Which Regional Emissions Tests Apply?



- Notes:
- Source: Section 93.109, Transportation Conformity Rule, 1997 Amendments
1. This flowchart does not include rural area flexibilities.
 2. This flowchart does not explicitly acknowledge options for areas that have clean data and a submitted control strategy SIP.

Motor Vehicle Emissions Budget Test

In the conformity rule, the budget test is described as the following:

40 CFR §93.118, as amended by 62 FR 43810-11, August 15, 1997

Criteria and procedures: Motor vehicle emissions budget.

(a) The transportation plan, TIP, and project not from a conforming transportation plan/TIP must be consistent with the motor vehicle emissions budget(s) in the applicable implementation plan (or implementation plan submission). This criteria applies as described in §93.109(c)-(g). This criteria is satisfied if it is demonstrated that emissions of the pollutants or pollutant precursors described in paragraph (c) of this section are less-than or equal-to the motor vehicle emissions budget(s) established in the applicable implementation plan or implementation plan submission,

(b) Consistency with the motor vehicle emissions budget(s) must be demonstrated for each year for which the applicable (and/or submitted) implementation plan specifically establishes motor vehicle emissions budget(s), for the last year of the transportation plan's forecast period, and for any intermediate years as necessary so that the years for which consistency is demonstrated are no more than ten years apart, as follows:

(1) Until a maintenance plan is submitted:

(i) Emissions in each year (such as milestone years and the attainment year) for which the control strategy implementation plan revision establishes motor vehicle emissions budget(s) must be less-than or equal-to that year's motor vehicle emissions budget(s); and

(ii) Emissions in years for which no motor vehicle emissions budget(s) are specifically established must be less-than or equal-to the motor vehicle emissions budget(s) established for the most recent prior year. For example, emissions in years after the attainment year for which the implementation plan does not establish a budget must be less-than or equal-to the motor vehicle emissions budget(s) for the attainment year.

(2) When a maintenance plan has been submitted:

(i) Emissions must be less-than or equal-to the motor vehicle emissions budget(s) established for the last year of the maintenance plan, and for any other years for which the maintenance plan establishes motor vehicle emissions budgets. If the maintenance plan does not establish motor vehicle emissions budgets for any years other than the last year of the maintenance plan, the demonstration of consistency with the motor vehicle emissions budget(s) must be accompanied by a qualitative finding that there are no factors which would cause or contribute to a new violation or exacerbate an existing violation in the years before the last year of the maintenance plan. The interagency consultation process required by §93.105 shall determine what must be considered in order to make such a finding;

(ii) For years after the last year of the maintenance plan, emissions must be less-than or equal-to the maintenance plan's motor vehicle emissions budget(s) for the last year of the maintenance plan; and

(iii) If an approved control strategy implementation plan has established motor vehicle emissions budgets for years in the time frame of the transportation plan, emissions in these years must be less-than or equal-to the control strategy implementation plan's motor vehicle emissions budget(s) for these years.

(c) Consistency with the motor vehicle emissions budget(s) must be demonstrated for each pollutant or pollutant precursor in §93.102(b) for which the area is in nonattainment or maintenance and for which

the applicable implementation plan (or implementation plan submission) establishes a motor vehicle emissions budget.

(d) Consistency with the motor vehicle emissions budget(s) must be demonstrated by including emissions from the entire transportation system, including all regionally significant projects contained in the transportation plan and all other regionally significant highway and transit projects expected in the nonattainment or maintenance area in the time frame of the transportation plan.

(1) Consistency with the motor vehicle emissions budget(s) must be demonstrated with a regional emissions analysis that meets the requirements of §§93.122 and 93.105(c)(1)(i).

(2) The regional emissions analysis may be performed for any years in the time frame of the transportation plan provided they are not more than ten years apart and provided the analysis is performed for the attainment year (if it is in the time frame of the transportation plan) and the last year of the plan's forecast period. Emissions in years for which consistency with motor vehicle emissions budgets must be demonstrated, as required in paragraph (b) of this section, may be determined by interpolating between the years for which the regional emissions analysis is performed.

(e) Motor vehicle emissions budgets in submitted control strategy implementation plan revisions and submitted maintenance plans.

(1) Consistency with the motor vehicle emissions budgets in submitted control strategy implementation plan revisions or maintenance plans must be demonstrated if EPA has declared the motor vehicle emissions budget(s) adequate for transportation conformity purposes, or beginning 45 days after the control strategy implementation plan revision or maintenance plan has been submitted (unless EPA has declared the motor vehicle emissions budget(s) inadequate for transportation conformity purposes). However, submitted implementation plans do not supersede the motor vehicle emissions budgets in approved implementation plans for the period of years addressed by the approved implementation plan.

Note: Section (e)(1) above was impacted by the March 2, 1999 Court decision.

(2) If EPA has declared an implementation plan submission's motor vehicle emissions budget(s) inadequate for transportation conformity purposes, the inadequate budget(s) shall not be used to satisfy the requirements of this section. Consistency with the previously established motor vehicle emissions budget(s) must be demonstrated. If there are no previous approved implementation plans or implementation plan submissions with motor vehicle emissions budgets, the emission reduction tests required by §93.119 must be satisfied.

(3) If EPA declares an implementation plan submission's motor vehicle emissions budget(s) inadequate for transportation conformity purposes more than 45 days after its submission to EPA, and conformity of a transportation plan or TIP has already been determined by DOT using the budget(s), the conformity determination will remain valid. Projects included in that transportation plan or TIP could still satisfy §§93.114 and 93.115, which require a currently conforming transportation plan/TIP to be in place at the time of a project's conformity determination and that projects come from a conforming transportation plan/TIP.

Note: Section (e)(3) above was impacted by the March 2, 1999 Court decision.

(4) EPA will not find a motor vehicle emissions budget in a submitted control strategy implementation plan revision or maintenance plan to be adequate for transportation conformity purposes unless the following minimum criteria are satisfied:

(i) The submitted control strategy implementation plan revision or maintenance plan was endorsed by the Governor (or his or her designee) and was subject to a State public hearing;

- (ii) Before the control strategy implementation plan or maintenance plan was submitted to EPA, consultation among Federal, State, and local agencies occurred; full implementation plan documentation was provided to EPA; and EPA's stated concerns, if any, were addressed;*
 - (iii) The motor vehicle emissions budget(s) is clearly identified and precisely quantified;*
 - (iv) The motor vehicle emissions budget(s), when considered together with all other emissions sources, is consistent with applicable requirements for reasonable further progress, attainment, or maintenance (whichever is relevant to the given implementation plan submission);*
 - (v) The motor vehicle emissions budget(s) is consistent with and clearly related to the emissions inventory and the control measures in the submitted control strategy implementation plan revision or maintenance plan; and*
 - (vi) Revisions to previously submitted control strategy implementation plans or maintenance plans explain and document any changes to previously submitted budgets and control measures; impacts on point and area source emissions; any changes to established safety margins (see §93.101 for definition); and reasons for the changes (including the basis for any changes related to emission factors or estimates of vehicle miles traveled).*
- (5) Before determining the adequacy of a submitted motor vehicle emissions budget, EPA will review the State's compilation of public comments and response to comments that are required to be submitted with any implementation plan. EPA will document its consideration of such comments and responses in a letter to the State indicating the adequacy of the submitted motor vehicle emissions budget.*
- (6) When the motor vehicle emissions budget(s) used to satisfy the requirements of this section are established by an implementation plan submittal that has not yet been approved or disapproved by EPA, the MPO and DOT's conformity determinations will be deemed to be a statement that the MPO and DOT are not aware of any information that would indicate that emissions consistent with the motor vehicle emissions budget will cause or contribute to any new violation of any standard; increase the frequency or severity of any existing violation of any standard; or delay timely attainment of any standard or any required interim emissions reductions or other milestones.*

In summary, the budget test must demonstrate consistency with the motor vehicle emissions budget from the applicable SIP and show that emissions within the time frame of the transportation plan/TIP are less-than or equal-to the SIP motor vehicle emissions budget(s). This consistency must be demonstrated for the budget year (if in the time frame of the plan/TIP) and for the analysis years. The following are major provisions of the motor vehicle emissions budget test.

What Is a Motor Vehicle Emissions Budget Test?

The emissions budget test criteria is satisfied when emissions of the pollutants or pollutant precursors are less-than or equal-to the motor vehicle emissions budgets established in the SIP. Transportation plans, TIPs, and projects not from a conforming transportation plan/TIP must be consistent with the motor vehicle emissions budget(s) in the applicable SIP. For additional information on motor vehicle emissions budgets see Section B.

The Analysis Years for the Motor Vehicle Emissions Budget Test

The conformity rule requires conformity be determined over the time frame of the transportation plan, usually a 20-year time frame. The regional emissions analysis must be performed for analysis years that are no more than 10 years apart. Analysis years applicable to the budget tests include:

Any years in the time frame of the transportation plan can be used, provided:

- not more than 10 years apart,
- analysis for attainment year (if in the time frame of the transportation plan), and
- analysis for last year of plan's forecast period must be included.

Which Nonattainment Areas are Required to Demonstrate Consistency With Their Emissions Budget?

The budget test is required once a SIP with a motor vehicle emissions budget is submitted and EPA finds the budget adequate.

Which Nonattainment Areas are Required to submit Control Strategy SIPs?

- a. Ozone nonattainment area - moderate and above,
- b. CO nonattainment area - moderate (>12.7 ppm) and above,
- c. All PM-10 nonattainment areas, and
- d. All NO₂ nonattainment areas.

Which Motor Vehicle Emissions Budgets Should Be Used to Demonstrate Consistency When Control Strategy Implementation Plan Revisions and Maintenance Plans Are Submitted?⁵

- a. If EPA has declared the motor vehicle emissions budget(s) adequate for transportation conformity purposes; consistency with the motor vehicle emissions budgets in submitted control strategy implementation plan revisions or maintenance plans must be demonstrated unless a previously approved SIP for the same time frame and CAA purposes exists,
- b. If EPA has declared an implementation plan submission's motor vehicle emissions budget(s) inadequate for transportation conformity purposes, consistency with the previously established motor vehicle emissions budget(s) must be demonstrated,
- c. If there are no previously approved implementation plans or implementation plan submissions with motor vehicle emissions budgets, the emissions reduction tests required must be satisfied. (Additional information on which SIP budgets apply and their related time frame is included in Section B.)

What Conformity Test Should Be Used before EPA has Found the Submitted Budget Adequate?

Use whatever conformity test applied before the new budget was submitted. For example, if your area has no other submitted or approved budgets for the given criteria pollutant, you would use the emission reduction tests that are required by 40 CFR 93.119 of the conformity rule. If you had previously approved budget(s) for a given pollutant or previously submitted budget(s) that EPA had found adequate, you would need to meet the approved or adequate budget(s) for all analysis years. The submitted budget is not used until EPA finds it adequate.

⁵ The submitted implementation plans do not supersede the motor vehicle emissions budgets in approved implementation plans that address the same time frame and CAA purpose.

Emissions Reduction Tests (for Areas Without Motor Vehicle Emissions Budgets)

In the conformity rule, the emissions reduction test is described as the following:

40 CFR §93.119, as amended by 62 FR 43812, August 15, 1997

Criteria and procedures: Emissions reductions in areas without motor vehicle emissions budgets.

(a) The transportation plan, TIP, and project not from a conforming transportation plan/TIP must contribute to emissions reductions. This criterion applies as described in §93.109(c) - (g). It applies to the net effect of the action (transportation plan, TIP, or project not from a conforming transportation plan/TIP) on motor vehicle emissions from the entire transportation system; and

(b) This criteria may be met in moderate and above ozone nonattainment areas that are subject to the reasonable further progress requirements of Clean Air Act §182(b)(1) and in moderate with design value greater than 12.7 ppm and serious CO nonattainment areas if a regional emissions analysis that satisfies the requirements of §93.122 and paragraphs (e) through (h) of this section demonstrates that for each analysis year and for each of the pollutants described in paragraph (d) of this section:

(1) The emissions predicted in the "Action" scenario are less than the emissions predicted in the "Baseline" scenario, and this can be reasonably expected to be true in the periods between the analysis years; and

(2) The emissions predicted in the "Action" scenario are lower than 1990 emissions by any nonzero amount;

(c) This criteria may be met in PM_{10} and NO_2 nonattainment areas; marginal and below ozone nonattainment areas and other ozone nonattainment areas that are not subject to the reasonable further progress requirements of Clean Air Act §182(b)(1); and moderate with design value less than 12.7 ppm and below CO nonattainment areas if a regional emissions analysis that satisfies the requirements of §93.122 and paragraphs (e) through (h) of this section demonstrates that for each analysis year and for each of the pollutants described in paragraph (d) of this section, one of the following requirements is met:

(1) The emissions predicted in the "Action" scenario are less than the emissions predicted in the "Baseline" scenario, and this can be reasonably expected to be true in the periods between the analysis years; or

(2) The emissions predicted in the "Action" scenario are not greater than "Baseline" emissions. "Baseline" emissions are those estimated to have occurred during calendar year 1990, unless the conformity implementation plan revision required by §51.390 of this chapter defines the "Baseline" emissions for a PM_{10} area to be those occurring in a different calendar year for which a "Baseline" emissions inventory was developed for the purpose of developing a control strategy implementation plan;

(d) Pollutants. The regional emissions analysis must be performed for the following pollutants:

(1) VOC in ozone areas;

(2) NO_x in ozone areas, unless the EPA Administrator determines that additional reductions of NO_x would not contribute to attainment;

(3) CO in CO areas;

(4) PM_{10} in PM_{10} areas;

(5) Transportation-related precursors of PM_{10} in PM_{10} nonattainment and maintenance areas if the EPA Regional Administrator or the director of the State air agency has made a finding that such precursor

emissions from within the area are a significant contributor to the PM_{10} nonattainment problem and has so notified the MPO and DOT; and

(6) NO_x in NO_2 areas.

(e) Analysis years. The regional emissions analysis must be performed for analysis years that are no more than ten years apart. The first analysis year must be no more than five years beyond the year in which the conformity determination is being made. The last year of the transportation plan's forecast period must also be an analysis year.

(f) "Baseline" scenario. The regional emissions analysis required by paragraphs (b) and (c) of this section must estimate the emissions that would result from the "Baseline" scenario in each analysis year. The "Baseline" scenario must be defined for each of the analysis years. The "Baseline" scenario is the future transportation system that will result from current programs, including the following (except that exempt projects listed in §93.126 and projects exempt from regional emissions analysis as listed in §93.127 need not be explicitly considered):

- (1) All in-place regionally significant highway and transit facilities, services and activities;*
- (2) All ongoing travel demand management or transportation-system management activities; and*
- (3) Completion of all regionally significant projects, regardless of funding source, which are currently under construction or are undergoing right-of-way acquisition (except for hardship acquisition and protective buying); come from the first year of the previously conforming transportation plan and/or TIP; or have completed the NEPA process.*

(g) "Action" scenario. The regional emissions analysis required by paragraphs (b) and (c) of this section must estimate the emissions that would result from the "Action" scenario in each analysis year. The "Action" scenario must be defined for each of the analysis years. The "Action" scenario is the transportation system that would result from the implementation of the proposed action (transportation plan, TIP, or project not from a conforming transportation plan/TIP) and all other expected regionally significant projects in the nonattainment area. The "Action" scenario must include the following (except that exempt projects listed in §93.126 and projects exempt from regional emissions analysis as listed in §93.127 need not be explicitly considered):

- (1) All facilities, services, and activities in the "Baseline" scenario;*
- (2) Completion of all TCMs and regionally significant projects (including facilities, services, and activities) specifically identified in the proposed transportation plan which will be operational or in effect in the analysis year, except that regulatory TCMs may not be assumed to begin at a future time unless the regulation is already adopted by the enforcing jurisdiction or the TCM is identified in the applicable implementation plan;*
- (3) All travel demand management programs and transportation-system management activities known to the MPO, but not included in the applicable implementation plan or utilizing any Federal funding or approval, which have been fully adopted and/or funded by the enforcing jurisdiction or sponsoring agency since the last conformity determination;*
- (4) The incremental effects of any travel demand management programs and transportation-system management activities known to the MPO, but not included in the applicable implementation plan or utilizing any Federal funding or approval, which were adopted and/or funded prior to the date of the last conformity determination, but which have been modified since then to be more stringent or effective;*
- (5) Completion of all expected regionally significant highway and transit projects which are not from a conforming transportation plan/TIP; and*
- (6) Completion of all expected regionally significant non-FHWA/FTA highway and transit projects that have clear funding sources and commitments leading toward their implementation and completion by*

the analysis year.

(h) Projects not from a conforming transportation plan/TIP. For the regional emissions analysis required by paragraphs (b) and (c) of this section, if the project which is not from a conforming transportation plan/TIP is a modification of a project currently in the plan or TIP, the "Baseline" scenario must include the project with its original design concept and scope, and the "Action" scenario must include the project with its new design concept and scope.

In summary, the build/no-build emissions reductions test requires an assessment of the emissions impacts of the proposed transportation plan, TIP, or projects not from a conforming plan/TIP (build or "Action" scenario) compared to the emissions impacts of the current transportation system plus projects that are under construction (the no-build or "Baseline" scenario).

In order to pass the build/no-build test, it must be demonstrated that emissions in the build ("Action") scenario are less than the no-build ("Baseline") scenario. For the no-greater-than 1990 test, the emissions in the "Action" scenario must be lower or equal to 1990 emissions. For the less-than-1990 test, the emissions in the "Action" scenario must be less than 1990 emissions by any nonzero amount. This analysis must be performed for the following pollutants and precursors (depending on nonattainment status): VOC, NO_x, CO, PM-10.

Definition of "Baseline" and "Action" Scenarios

Exhibit 24 illustrates how the projects and activities to be included in the "Baseline" and "Action" scenarios. This process is very important as the outcome of emissions reduction tests (either build/no-build or 1990 tests) hinges upon the definition of the "Baseline" and "Action" scenarios and the results of the subsequent regional emissions analysis.

The "Baseline" scenario is defined for each analysis year for the future transportation system that will result from current programs, including the following (except that exempt projects listed in 40 CFR §93.126, as amended by 62 FR 43816-17, Aug. 15, 1997 and projects exempt from regional emissions analysis as listed in 40 CFR §93.127, as amended by 62 FR 43817-18, Aug. 15, 1997 need not be explicitly considered):

40 CFR §93.119 (f)(1)-(3), and (h), as amended by 62 FR 43812, August 15, 1997

- (1) All in-place regionally significant highway and transit facilities, services and activities;*
- (2) All ongoing travel demand management or transportation-system management activities; and*
- (3) Completion of all regionally significant projects, regardless of funding sources, which are currently under construction or are undergoing right-of-way acquisition (except for hardship acquisition and protective buying), come from the first year of the previously conforming transportation plan and/or TIP, or have completed the NEPA process.*

The "Action" scenario is defined for each analysis year for the transportation system that would result from the implementation of the proposed action (transportation plan, TIP, or project not from a conforming transportation plan/TIP) and all other regionally significant projects in the nonattainment area: (excluding exempt projects listed in 40 CFR §93.126, as amended by 62 FR 43816-17, Aug.

Exhibit 24
Projects & Activities Included in the Regional Emissions Analysis

Year	“Baseline” (No-build) Scenario	“Action” (Build) Scenario
Base Year (2000)	<p>❶ All in-place regionally significant highway and transit facilities, services and activities</p>	
Milestone Year (e.g., 2003)	<p>❶ + ❷ All current additional in-place regionally significant highway and transit facilities, services and activities+ All ongoing TDM or TSM activities + All regionally significant projects, regardless of funding sources, which are (1) currently under construction, or (2) undergoing right-of-way acquisition (except for hardship acquisition and protective buying), or (3) have completed the NEPA process, will be opened by 2003 + Projects which are included in the first year of the previously conforming transportation plan/TIP, and which will be opened by 2000+ Original design concept and scope of a project not from a conforming transportation plan/TIP but is a modification of a project currently in the plan/TIP</p>	<p>❶ + ❷ + ❸ Other regionally significant projects, including TCMs, in the plan which will be opened by 2000+ The incremental effects⁶ of any non-Federal TDM/TSM activities not included in the applicable SIP which have been modified since the last conformity determination to be more stringent or effective + All expected regionally significant highway and transit projects which are not from a conforming transportation plan/TIP open by 2003+ All expected regionally significant non-Federal highway and transit projects completed by 2003+ The new design concept and scope of a project not from a conforming transportation plan/TIP but is a modification of a project currently in the plan/TIP</p>
Attainment Year (e.g., 2005)	<p>❶ + ❷ + ❹ Additional projects from the last three categories of ❷ above which will be open after 2000 and by 2005</p>	<p>❶ + ❷ + ❸ + ❹ + ❺ All other regionally significant projects as in ❸ above which will be open after 2000 and by 2005</p>
Intermediate Year (e.g., 2012)	<p>❶ + ❷ + ❹ Additional projects from the last three categories of ❷ above which will be open after 2005 and by 2012</p>	<p>❶ + ❷ + ❸ + ❹ + ❺ All other regionally significant projects as in ❸ above which will be open after 2005 and by 2012</p>
Last Year of Transportation Plan (e.g., 2020)	<p>❶ + ❷ + ❹ Additional projects from the last three categories of ❷ above which will be open after 2012 and by 2020</p>	<p>❶ + ❷ + ❸ + ❹ + ❺ All other regionally significant projects as in ❸ above which will be open after 2012 and by 2020</p>

Source: 40 CFR §93.119, as amended by 62 FR 43812, Aug. 15, 1997.

⁶40 CFR §93.119(g)(3) All travel demand management programs and transportation system management activities known to the MPO, but not included in the applicable implementation plan or utilizing any Federal funding or approval, which have been fully adopted and/or funded by the enforcing jurisdiction or sponsoring agency since the last conformity determination.

15, 1997 and projects exempt from regional emissions analysis as listed in 40 CFR §93.127, as amended by 62 FR 43817-18, Aug. 15, 1997).

40 CFR §93.119 (g)(1)-(6) and (h), as amended by 62 FR 43812, August 15, 1997

- (1) All facilities, services, and activities in the “Baseline” scenario;*
- (2) Completion of all TCMs and regionally significant projects (including facilities, services, and activities) specifically identified in the proposed transportation plan which will be operational or in effect in the analysis year, except that regulatory TCMs may not be assumed to begin at a future time unless the regulation is already adopted by the enforcing jurisdiction or the TCM is identified in the applicable implementation plan;*
- (3) All travel demand management programs and transportation system management activities known to the MPO, but not included in the applicable implementation plan or utilizing any Federal funding or approval, which have been fully adopted and/or funded by the enforcing jurisdiction or sponsoring agency since the last conformity determination;*
- (4) The incremental effects of any travel demand management programs and transportation system management activities known to the MPO, but not included in the applicable implementation plan or utilizing any Federal funding or approval, which were adopted and/or funded prior to the date of the last conformity determination, but which have been modified since then to be more stringent or effective;*
- (5) Completion of all expected regionally significant highway and transit projects which are not from a conforming transportation plan/TIP; and*
- (6) Completion of all expected regionally significant non-FHWA/FTA highway and transit projects that have clear funding sources and commitments leading toward their implementation and completion by the analysis year.*
- (h) Projects not from a conforming transportation plan and TIP. For the regional emissions analysis required by paragraphs (b) and (c) of this section, if the project which is not from a conforming transportation plan and TIP is a modification of a project currently in the plan or TIP, the “Baseline” scenario must include the project with its original design concept and scope, and the “Action” scenario must include the project with its new design concept and scope.*

Analysis Years for Emissions Reduction Tests

The first analysis year must be no more than five years beyond the year in which the conformity determination is made. The last year of transportation plan’s forecast period must also be an analysis year (40 CFR §93.119(e), as amended by 62 FR 43812, Aug. 15, 1997.) Analysis years should be no more than ten years apart, so an intermediate year(s) must also be included.

CONFORMITY TEST HIGHLIGHTS IN THE 1997 CONFORMITY RULE

March 2, 1999 Conformity Court Decision

- ◆ Submitted SIP budgets can be used for conformity purposes, after EPA finds them adequate;
- ◆ If EPA finds the submitted budget inadequate for conformity an existing adequate or approved budget can be used. If there is no existing approved budget in place, the emission reduction tests (build/no-build and/or 1990 test(s)) would be used.

- ◆ A new, 90-day adequacy process has been created by EPA to review submitted budgets for conformity purposes. EPA continues to use the adequacy criteria from the 1997 conformity rule. Also [see Section B](#) for a full discussion of the use of SIP budgets for conformity.

There Is More Flexibility Even Where There Are No Submitted SIP Budgets

Ozone and CO areas that are not required to submit SIP budgets can either satisfy the build/no-build test, or show that emissions are no-greater-than 1990 levels.

Requirements for Network Modeling Are Limited to Large, Urban Areas

Network modeling is required in serious- and above-ozone and CO nonattainment areas with an urbanized population greater than 200,000. Areas currently using network models must continue to use them. Future additional guidance will be issued ([see Chapter 6](#) for details.)

Rural Areas Have Flexibility to Choose Among Several Conformity Tests

[See Chapter 9](#) for details.

AGENCY ROLES

Agency roles in integrating travel demand and emissions factor modeling into regional emissions analysis efforts are defined in the interagency consultation process, as discussed in [Chapter 2](#). Typical agency roles in integrating transportation and emissions models are shown in Exhibit 25.

Exhibit 25
Typical Agency Roles in Integrating Transportation & Air-Quality Modeling

Agency	Role ⁷
MPO	Usually responsible for maintaining and operating the regional travel demand model; also, normally responsible for integrating the results of the separate transportation, emissions, and air-quality modeling efforts carried out by the various agencies
State DOT	Updates Highway Performance Monitoring System (HPMS)
State/Local Air Agency	One of these agencies is usually responsible for configuring and operating the MOBILE model (for developing emissions inventories)

⁷ All of the agencies included in the table also participate in the interagency consultation process required under 40 CFR §93.105, as amended by 62 FR 43804-06, Aug. 15, 1997.

TCM ANALYSIS

As stated in the preamble to the 1993 conformity rule (40 CFR, 58 FR 62198, Nov. 24, 1993), determination of timely implementation of TCMs in approved SIPs is not based on retrospective analysis of TCM effectiveness or other analysis by the MPOs or DOT to affirmatively determine whether each TCM had its predicted effectiveness (unless the SIP explicitly includes such a requirement).

EPA requires any analysis supporting a conformity determination to reflect the latest available information regarding the effectiveness and actual implementation of the area's TCMs, in order to satisfy the criteria regarding the use of the latest planning assumptions (40 CFR §93.110, as amended by 62 FR 43809, Aug. 15, 1997). Because of this requirement, it is critical that all TCMs included in the SIP be integrated into the transportation modeling process.

In addition, all other regionally significant transportation strategies (whether they are included in the SIP or not) should also be integrated into the plan and TIP conformity analyses. The effects of these measures on travel demand should be properly accounted for, in order to assess the impact on overall regional travel and emissions, either as part of the four-step modeling process or through off-model analysis, as discussed below. Non-regionally significant TCMs can be analyzed with best professional practice such as performing an off-model analysis determined through the interagency consultation process.

OFF-MODEL ANALYSIS

Off-model analysis can be regarded as "reasonable professional practice" and should be determined through the interagency consultation process. Off-model analysis can be used in situations such that emissions estimates from projects cannot be obtained through the regional modeling process. One such situation is to estimate emissions from projects that are not regionally significant, but which have or affect vehicle travel. For example, the regional emissions analysis may assume that VMT on local streets not represented in the network model is a certain percentage of network VMT, without explicitly considering the new local street. In addition, the benefits of TCMs that cannot be analyzed through the regional modeling process may be estimated in accordance with reasonable professional practice (i.e., off-model analysis) (40 CFR, 58 FR 62211, Nov. 24, 1993).

A variety of sketch planning tools are available to estimate the impact of various TCMs on local travel. These can be used to develop estimates of the change in travel characteristics (in terms of VMT, vehicle trips and average speed) on affected roadways. Adjustments can then be made to the travel data output by the regional travel demand model. Another situation under which off-model analysis can be applied is when a number of planning agencies may have limited ability to perform mode choice analysis because they do not have mode choice models or the models they have are insufficient to look at a particular issue. Examples of off-model analysis techniques include:

Transportation/Air Quality Sketch Planning Methods

One of the earliest reports on these methods was commissioned by EPA in the late 1970s.⁸ The manual leads an analyst through the steps necessary to estimate the size of the target market and properly estimate the changes in travel indicators (mode share, emissions, etc.) likely to result from the application of various demand management measures. Methods for analyzing various traffic operations improvements also are discussed, including green band and computerized traffic-signal timing methods. Worksheets and simple computer applications are explained step-by-step, and examples are provided.

TDM Evaluation Model⁹

The FHWA is distributing a special software product which can serve as a substitute or enhancement to a conventional mode-choice model capability. The TDM model incorporates a pivot-point procedure to estimate mode-choice changes, meaning that it forecasts the change in a starting mode share based on information as to the changes in decision variables associated with the policy action. A wide group of TCM, TDM, and other strategies can be considered, individually, or grouped into programs, with great flexibility at varying the effectiveness levels of the strategies and targeting their application. The starting base may be either trip tables from an existing planning process, special trip tables formed from survey data, or simply aggregate estimates of person, vehicle and/or transit trips. The coefficients in this model have been synthesized from national experience, and can be altered by the user to use local or other coefficient estimates. Results are both aggregate and in trip table format. The trip table results can be returned to the four-step process (if applicable) for traffic assignment.¹⁰

TCM Tools¹¹

More recently, microcomputer-based spreadsheet models have been developed to carry out similar analysis. One spreadsheet model, originally developed for the San Diego Association of Governments (SANDAG) and later developed for the FHWA, evaluates the effect of TCMs on travel, emissions, and cost. Specifically, it calculates baseline travel characteristics, estimates TCM impacts on trips, VMT and speed, prepares emissions inventory estimates and estimates costs of control measures to the public and private sectors and to vehicle owners. The travel module is a spreadsheet that contains equations for quantifying TCM impacts on travel based on user inputs and elasticities (either default values based on literature reviews or locally derived values that are input). The emissions module is designed to accept inputs from either MOBILE (the Federal version) or EMFAC (the California version) emissions factor models that represent fleet emissions rates for the area of interest.

⁸ Cambridge Systematics, Inc., *Transportation Air Quality Analysis - Sketch Planning Methods* (two volumes), report prepared for U.S. EPA, Washington, DC, December 1979.

⁹ *User's Guide: Travel Demand Evaluation Model*, COMSIS Corporation for the Federal Highway Administration, 1993.

¹⁰ *User Manual for Software Developed to Quantify the Emissions Reductions and Cost Effectiveness of Selected Transportation Control Measures*, prepared for the Federal Highway Administration, July 1994.

¹¹ Sierra Research and JHK & Associates, *Methodologies for Quantifying the Emissions Reductions of Transportation Control Measures*, prepared for the San Diego Association of Governments, 1990.

Commuter Model

The COMMUTER Model is a spreadsheet-based tool featuring a user-friendly interface to calculate air quality and travel benefits. The COMMUTER model uses a pivot-point methodology to estimate changes in trips and VMT from baseline conditions and a look-up table of emission factors from EPA's MOBILE model to estimate the resulting emissions changes. COMMUTER employs key shortcuts in the amount of data used and the number of micro-level calculations that are performed. The result is a conscious but judicious tradeoff of some accuracy for a significant increase in ease and flexibility for the user compared to previous methods. COMMUTER offers two levels of analysis. Regional analyses can be done on programs covering an urban area, a central business district or a highly traveled corridor. Site-specific analyses enable benefits to be projected for programs at individual worksites. The COMMUTER Model is currently in beta form with final release expected by EPA in late Spring, 2000.

Methodologies for Estimating Emission and Travel Activity Effects of TCMs

This report¹² provides a step by step approach for quantitatively estimating the travel and emissions changes that are possible from implementing a number of transportation control measures. The report includes equations for calculating changes in the number of trips, vehicle miles traveled, and speed, as well as methods for estimating emission effects of these travel activity changes.

Benefits Estimates for Selected TCM Programs

This report¹³ illustrates the use of EPA's Methodologies for Estimating Emission and Travel Activity Effects of TCMs by applying the methodologies to the estimation of benefits for six operating TCM programs.

Quick Response System

This procedure, known as QRS, consists of a collection of short-cut, parametric methods which may be used to perform a transportation analysis in the absence of a local model system. Procedures exist to cover the steps of trip generation through traffic assignment, including mode choice. It exists in either microcomputer or manual form, and allows users with minimum data and computer capability to form reasonable estimates of travel response.

Few sketch models, if any, attempt to estimate secondary effects on neighboring roadways (e.g. due to shifts in trip routing). This simplistic approach is normally acceptable when the impact of the TCM is not expected to be regionally significant. This would not be the case, however, for a TCM that is projected to have significant regional impacts. In such a case, the travel impacts of the TCM should be modeled using the regional travel demand model, so that any secondary effects are properly evaluated. Additional guidance on this issue can be found in the *Manual of Regional Transportation*

¹²EPA420-R-94-002, July 1994.

¹³EPA420-R-98-002, March 1999.

Modeling Practice developed for NARC (Section 3.5, Supplemental Methods, pp. 3-73).

Off-model Analysis for Heavy-duty Vehicles

Another area of off-model analysis relates to the estimation of travel for heavy-duty vehicles.¹⁴ Typically, the four-step process models are designed to allocate household and employment activity to specific geographic locations across the region. Freight activity is not typically addressed in this process. As a result, a variety of techniques have been developed to forecast the VMT associated with heavy-duty vehicles. These techniques span the gamut from assigning freight a constant share of non-freight VMT estimates to the development of independent econometric forecasting models to estimate heavy-duty truck travel. [See Part IV](#) for information on EPA new heavy-duty diesel vehicle standards.

Heavy-duty vehicles can be a significant part of the nitrogen oxide (NO_x) motor vehicle emissions inventory in a typical urban area. Thus, in ozone and PM nonattainment areas where NO_x is an identified emission precursor, there is growing interest in how heavy-duty truck travel is estimated and whether the trucks' activity levels (both VMT and speeds) are being properly represented in emissions inventories in the SIP and those used to demonstrate conformity with the SIP.

¹⁴ NCHRP Report 388, *A Guidebook for Forecasting Freight Transportation Demand*, Cambridge Systematics with Leeper, Cambridge & Cambell, Sydec and Thomas Corsi and Curtis Grimm, 1997.